

Race to develop coronavirus vaccine

Vaccines harness the natural activity of the body's immune system to recognise and attack a virus or bacteria when it is infected. Vaccines are traditionally grown inside living cells such as hens' eggs

Egg-based vaccines: Virus injected into fertilised hen's egg

Virus multiplies inside egg. Contents removed, purified and chemically deactivated before packing as vaccine

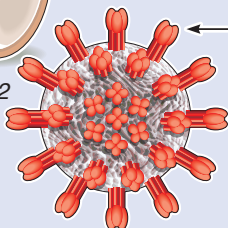
Process takes several months

Cell-based vaccines:

Vaccine grown in cultured animal cells instead of hens' eggs

Vaccine ready in weeks, but safety trials take months

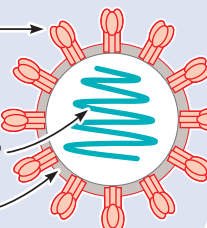
Sars-CoV-2 virus



Fusion protein

Virus genome

Virus envelope



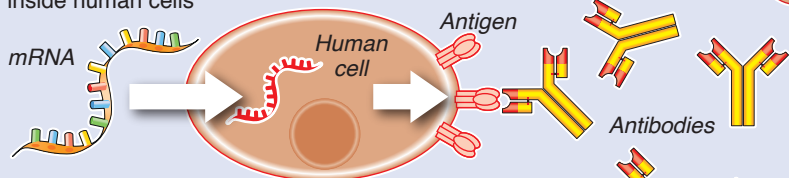
Human cell

ACE2 receptor*

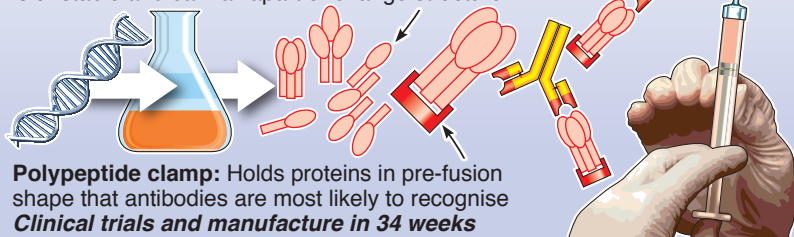
Fusion protein: Enables virus to bind to ACE2 receptor and invade human cell

RNA vaccines: Messenger RNA (mRNA) contains genetic recipe to produce antigen – fusion protein – inside human cells

Antigen: Stimulates immune system to generate antibodies
Vaccine ready in six weeks



Molecular clamp vaccines: Fusion protein is unstable and can fall apart or change structure



Polypeptide clamp: Holds proteins in pre-fusion shape that antibodies are most likely to recognise
Clinical trials and manufacture in 34 weeks